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The Official Journal of the Rocks and Minerals Association

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Edited and Published by Peter Zodac

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Whither Are We Drifting?

By A. J. HARSTAD, *Helena, Mont.*

It has been my opinion that much of the recent activity and enthusiasm in the mineralogical field has been of doubtful benefit to mineral collecting and some of it a down right detriment. I am going to set forth my reasons for thinking so and some suggestions that I believe to be really constructive. In the first place much of the present activity is not mineral collecting at all. I doubt that it would average two real collectors per hundred of membership right now and that it will never mean more than four per hundred. And the worst of it is that I can see no real effort on the part of many of the leaders to inculcate the real spirit of mineral collecting into the recruits to the game. Real mineral collecing is something more than following a packrat instinct to gather together a hodge-podge of "pretty stones and shiny rocks." Real collecting calls for a deep and serious consideration of type, form, locality and association as well as the bringing together of species and varieties and does not require that a specimen be surrounded by an aura of prismatic color play before it is considered worthy ot a place in the cabinet. The man, who, standing before a clinochlore crystal, said: "I know that you are ugly but I feel that you are great," was a real mineral collector. You could buy all the precious opal that came your way but you still would not really know anything about opal until you had given careful study to dull, chalky hydrophane and grey sinter. Borrowing again to emphasize my point: "What can he know of tourmalines who only the Mesa Grande tourmalines knows?" The present mis-directed enthusiasm has brought into our ranks hundreds who are not now and never will be anything but bric-a-brac collectors and the best that can be said is that they are a doubtful asset to mineral collecting.

Another bad feature is the uncontrolled exploitation and stripping of localities. If cooler counsel is not brought into play we are going soon to see the day when the country will be posted against mineral collecting as much of it is now posted against fishing and hunting. When we are not without examples of this right here in one of the most sparsely settled states of the Union, I can imagine what it might be in the more populous and accessible places. If, after due consideration of property rights, there ever was a field where "finders" should be "keepers" it ought to be this one because in most instances the finding is a result of long and laborious search. If an item is worth lugging home, and particularly if it is worth advertising for sale, it is also worth paying something for, especially if the owner looks like he might need the money, which he generally does.

One thing that people without mining experience do not know is that the pile of "pretty" ore on the dump of the prospect is not there to be shipped as commercial ore. It is there to advertise the possibilities of the prospect to a possible buyer or backer. To strip a dump of such ore is a far greater loss to the prospector than the bullion value of the ore. Another thing this is going to bring about is an increasing difficulty in obtaining specific localities for the more desirable of the new finds. In fact this condition is already cropping up. In my own case I have in the last couple of years made 5 or 6 discoveries that would be of interest in the crystallographic or gem cutting field. One or two of these finds I believe might become of real importance. Under present conditions these finds will not be developed by me until I have money enough to both open and CLOSE them. I am confident that probably within two weeks after reports were printed or the material was offered for sale the migration would be under way and from then on I would have to stand guard with a shot gun to protect my rights. Outside of such contributions as I would make to my friends and regular customers why should I leave open to the public something that cost me many sweaty days and much dodging of rattlesnakes and wood ticks to find? I can realize that there are many other producers who feel the same way. I could elaborate on this but space costs the editor of this magazine real money and I have covered the main points.

Much of the enthusiasm in the new movement has been directed toward getting the young folks into the field. Now—both the kids and their leaders are going to accuse me of being a "meanie," but let's get the cards on the table. Of course it is commendable and necessary to get young blood into the game, but why use a 100 per cent effort to get a 5-10 per cent result? Anyone who knows anything about human nature knows that a year or two from now 90 to 95 per cent of the kids are going to be in full cry after another hobby, with mineral collecting forgotten. I need no greater proof of this than to ask you to review your own youth. As a matter of cold fact the advent of a few thousand kids into this field would break every dealer and publication that catered to them. I would not say that any effort should be made to keep them out but I do say that no high pressure effort should be made to bring them in. Then we would have a greater assurance that those who did come in would stick and would eventually carry at least their own weight in the movement.

Of course it would be too bad to let all this enthusiasm work itself out in a mis-directed effort and having brought the matter up it is my duty to suggest how it could be properly directed. The foundation of the whole structure is a known, dependable, calculable and better demand at fair, cash prices for the better grades of specimens. Once this condition is established the producer will realize more out of his deposit and have an inducement to search further; the dealer will have a larger and better patronage; he, in turn, can give the national publication much better advertising support, thus practically insuring that we will have a good publication and the private collector can in turn invest in the better grade of specimens with some confidence that he can get back more of that investment in case he wants to sell than he can expect to get now. If all his enthusiasm and energy had been directed, or should now be diverted, to getting into this field 100 wealthy amateurs in the science, that alone would come close to putting mineral collecting on a sound basis for a decade or maybe a generation. But there are other strings to this bow. With the exception of a few, nationally known, well endowed institutions most of our museums are without proper support. Many of them with part time curators, others with no curators, and many probably without any funds at all. With a little work might it not be possible to secure for each of these state museums an average of a $10,000 appropriation to be held intact and the interest used for purchase of specimens and for nothing else? That might mean a $25,000 turnover of new business per year, or, as it would be a long time plan, a turnover of a quarter of a million dollars in ten years. Some such plan worked out for city museums and the ball is that much bigger. If properly presented it might be possible to induce some of the wealthier people, who

would not care to collect themselves, to present to some museum a case of good minerals to perpetuate their own names, or as a memorial to some departed loved one.

For the cost of one issue of one of the unnecessary magazines we could get out and have printed a well written and illustrated circular that could be used to lay this before legislators, officials and others and if a personal letter accompanied it there would be paved the way for an interview and more active work on the proposition. Here is outlined a project for the clubs to work on and one that if brought to successful conclusion would really be doing something for mineral collecting.

Some of you might dismiss this as the wail of a disgruntled dealer. Let me set you right on that. As far as the total volume of business for the established dealer is concerned it does not make much difference if we have one or twenty magazines in this field. Only a small proposition of the fraternity are really buyers of minerals. The number of magazines in the field would hardly affect this percentage or the total very much for any dealer. But here is the rub. Not all collectors subscribe to all magazines. If they did there would be no object in much of what I have written. But I do believe that nearly all of the collectors get to read nearly all of the magazines, either through city or club libraries or by borrowing and exchanging. If that is true, when a dealer takes space in another magazine he is doubling his advertising appropriation to reach only a neglible number of new names. And the more magazines he advertises in the smaller would be the results per dollar of advertising. In fact, if a dealer patronized all of them he could easily advertise himself OUT of business. Couple that with the fact that by far the greatest proportion of replies that come in are from people who either have not the means or the inclination to buy anything and you have outlined for you a real problem facing the established dealers. On top of that, much of the activity is directed toward encouraging exchanging and direct advertising by producers. And I suppose there are producers who wonder why the dealers can not take up their output and club editors who wonder why the dealers are not using some or more space in their publications. Possibly some are actuated by the idea that the game can get along without the dealers. That would be on a par with some other ideas that have been advanced in the new movement. Let me ask a question. Do you know of any great collection that was built up wholly by exchanging or do you know of any near-great collection that was built up mainly or wholly in that way? Maybe some of you might try to argue that the dealers' prices are too high. I will tell you how to lower them. Get your support squarely back of ONE National magazine and keep it there. Put some constructive enthusiasm back of the plans I have outlined here. Then don't write a dealer for expensive catalogs or price lists until you know you are ready to buy and have the cash with which to do it. Prices are mainly dependent upon two things, volume of sales and percentage of overhead costs. Increase the one and reduce the other and prices will come down even if they were not too high to start with.

Maybe some of you have not been exactly satisfied with what Mr. Zodac has put in ROCKS and MINERALS or the way he has handled it. The best answer to that is to ask is there any other magazine in this field that suits you 100 per cent? Let's not be children. For any editor to get out a magazine that would 100 per cent suit all subscribers would mean to get out as many individual issues as there were subscribers. Lots of things have appeared in ROCKS and MINERALS that did not particularly interest me, but I realize that there are others to consider and as long as Mr. Zodac doesn't swing over to serialized fiction and poetry I'm for him.

The question is this, are you going to support and develop a great national magazine, published by an editor of experience, judgment and discrimination, or are you going to scatter your support among a number of localized publications which in the very nature of things must either give up the ghost or become house organs for a mutual admiration society.

I saw these developments coming and privately went on record against them a long time ago, but I have ex-

perience enough to know that to get in the way of the steam roller when the steam is under full pressure would be simply to get flattened out without impeding the roller. Now the pressure seems to be dropping a bit and it seemed to me that the time was ripe to expect some vigorous support in a call for the return of the Future of mineral collecting to the capable hands that had it in their keeping and go forward to new heights of real achievement. Vigorous support of one magazine—ROCKS and MINERALS—is the first step toward this. The greatest service that clubs could render for mineral collecting right now would be to make a paid up subscription to ROCKS and MINERALS one of the requirements for membership.

The Preparation of Rocks and Minerals for Study and Exhibition*

By B. O. REBERHOLT

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The following text is based on the knowledge from practice and experience in preparing rocks and minerals for exhibition and studying purposes, which preparation is done in the cutting and grinding laboratory of the National Museum. It is difficult, however, to explain the progress of each mineral from start to finish, yet there is a certain basic knowledge of systems and methods learned through experience which gives a satisfactory result whatever the purpose may be. All the varieties of rocks (minerals and fossils), from the most common to the rarest specimens, in their shape and form direct from the crust of the earth, are prepared for the valuable purpose of scientific study. They are also prepared for exhibition purposes. In the latter case it is necessary to produce on them an extremely smooth and glossy surface. Rocks are formed either by combinations of minerals or remains of extinct animals and plants which are embedded in rocks. Also the natural crystallized structure, or combination of different minerals, is beautified with a most colorful, lustrous and velvety appearance for exhibition. Nearly all mineral and gem stones, as found in nature, are opaque and dull and are seldom flawless. Therefore, in order to be more clearly identified and made attractive to the eye, it is important that they be cut and shaped.

The cutting is done by a band saw with wheels thirty-six inches in diameter, which has a speed of one hundred revolutions per minute. This speed obtains the best result in cutting the harder and softer specimens. When going too fast, too much of the carborundum is carried or rushed through on the band without cutting. Carborundum grain No. 100, mixed with water, operates from a feeder in front of band by dropping it into a trench made of molding clay. Along the cutting line the trench serves as protection in stopping the abrasive from running over the specimen and going to waste. Also, the trench is invaluable in keeping the abrasive close to the band at all times. It is important that special care be given in feeding the carborundum. If fed too much, there is danger of choking the saw. Then, too, if fed too slowly the process of cutting is too drawn out and not timed correctly. In other words, there is just one certain rate of speed which must be maintained continuously for perfection.

The specimen must not be pushed too hard against the band. If so, the carborundum will squeeze away from the edge of band and cut irregularly. Very little force must be used on a

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soft specimen and not in any case must the band be forced into the specimen. There is, however, a lot to learn about cutting minerals with a band saw. The user of such a piece of machinery must study every angle of the sawing, for if not operated correctly in the harder and softer minerals, the band is very apt to twist and run crooked, thereby cutting very slowly and wasting time and materials. Then, too, other trouble may occur. It is of the greatest importance that the cut be made straight from beginning to finish.

In sawing the specimen it must first be clamped down securely to the bandsaw base so that it will not move in the slightest degree, and in some cases the specimen must be embedded in plaster paris so as to make a flat and solid base.

After the rock is cut through, and before obtaining a good polished surface, the face must be absolutely smooth. Cast iron wheels of different sizes in diameter, turning in horizontal positions, are used. These wheels have a speed of one hundred and fifty revolutions per minute. Carborundum grain, hardness about 9½ on the mineral scale, size 100, which is the coarsest grade of abrasive used in the Museum laboratory, is mixed with water and is used in grinding down the sawed face of the rock until an even surface is obtained on the full face. (All abrasive and polishing powder is mixed with water). Specimen is then washed and cleaned thoroughly, smaller specimens being cleaned in running water and removed to another wheel and a finer abrasive used. I will here state that as long as the grinding progress is going on, three separate grinding wheels are used, one for each grade of abrasive. It is of great importance that a separate grinder be used in changing from the coarser abrasive to the finer, as only one grain of the coarser abrasive will scratch and mark the face of a specimen.

The second finest grade of abrasive, size F, is used in grinding the specimen until streaks from the coarser abrasive are smoothed down. Again the specimen must be cleaned thoroughly and special care must be taken to see that every bit of the coarser abrasive is removed from the hands and specimen before starting the next grinding.

This final grinding is by far the most important. The finest abrasive flour is used for this operation. Therefore the grinding is very slow, especially on the harder specimens, and the grinding surface is not completed until the coarseness is entirely removed and left as smooth as glass. The softer specimen is afterwards smoothed down by hand, using a piece of felt and flour abrasive so as to eliminate every scratch or mark that may occur from impurity in the abrasive or from friable spots on face of specimen.

The specimen is now ready for polishing. This is done on a wheel made with a wooden base which has a convex felt top, although a flat topped wheel is occasionally used but is not preferable in polishing a flat surface. Such a wheel (polishing buffer) is run at a speed of two hundred revolutions per minute. Tin oxide powder mixed in water is used for polishing. Magnesium oxide or chromium oxide is also used for polishing certain kinds of minerals, which is learned through experience. However, the different minerals are more or less slow in polishing and are not perfected until the face has an even and bright polish. Large and heavy specimens are ground and polished with machinery specially constructed for that purpose, otherwise the same method is used as already described.

The foregoing text refers to flat faced specimens only. The cutting of gem stones is an entirely different problem. Stones, as found in the natural form, must be cut and polished so as to show their real beauty and lustrous combination of colors into which the semi-precious stones may be developed. Semi-precious stones, such as the turquoise, jade, jasper, agate and many others, are always opaque or dull and are usually cut with a curved surface (cabochon cut) or flat with curved edge. Gems, as cut from the different minerals, must be selected from solid stones, flawless and with beauty of color. They are cut and shaped on a flat grinding wheel, which makes the job very difficult. The back or bottom part of the stone is cut to a flat surface. A stick of wood is then fastened to the flat part with sealing wax and serves as a hand-hold while cutting.

The coarsest grade of abrasive is used for the first grinding and the stone is cut to its full form before changing to the next finer grinding. While the grinding is going on the stone must be in constant motion so as not to make a flat surface. It must be cut absolutely to an even curve, and its shape must be uniform. These facts are not only important in the cutting but also in the appearance. The beauty of the gem stones lies not only in their combination of beautiful colors, but also in their form and shape, which is essential for their proper development. After the stone is operated through the different finer grades of abrasive to the final grinding and if it be apparent through a magnifying glass that the cut surface is absolutely smooth and free from scratches, the final grinding should then be done by the very finest abrasive of alundum oxide which smooths off the surface to a finish and it is then ready to polish. The polishing of gem stones is practically the same as that of any other smooth surfaced minerals and as I have mentioned before, is done on a felt lap with several different kinds of oxide powder, one for each individual kind of stone, as the case may be. It is well to remember that the curved surface of the semi-precious stones is finished with a much higher polish than any flat polished surface, which is due to the cabochon or unfacetted form into which they are cut.

Another form of polishing minerals is called "Polished Sections." The minerals are always a composition of metallic mineral. In producing a polished section from these minerals a piece about the size of a small walnut is selected from the metallic rock for studying purposes. The piece of mineral is ground flat on one side with the coarser and finer abrasive and then placed directly inside of a small brass frame or brass tubing and placed on a warm plate, not hot, with smooth face against the plate. A piece of paper is placed between the warm plate and the specimen. A mixture of rosin and powdered shellac, cooked in turpentine until the proper hardness is secured, is poured into the brass frame to hold the specimen in place. The paper prevents the cooked mixture from sticking to the warm plate. The brass frame with specimen is then removed for cooling. After the mixture is quite hard the specimen is then ground once more on the iron lap so as to even off the face of specimen and the hard mixture, the brass frame serving as a hand-hold. Specimen is now changed over to a small lap with wooden base on which a piece of muslin cloth is fastened. The specimen is then ground down to a finish with the finest alundum abrasive. The harder and softer materials of the metallic minerals are now considered as absolutely smooth and even, not only to the naked eye, but also through a magnifying glass. A selection of the finest grade of polishing powder is used in operation of a polished section on account of fine grained materials and also on account of the difference in the hardness in the selected mineral. A clean piece of muslin cloth is used on the wooden base as a polishing lap and chromium oxide is used as polishing powder. This operation requires about five minutes for each specimen, which is enough time to give the polished face of the section a clearer and smoother surface. The final operation is then applied to the specimen. A piece of Samson cloth (Billiard cloth) is used on the wooden wheel base as a polishing lap and magnesium oxide as polishing powder. The friction of this fine oxide powder, as used against the already polished surface, is very little and the specimen requires but the slightest removal of material by this action so as to finish the job on these sensitive mixed minerals. The combination of this fine polishing material will finish the specimen with the high grade of polish which is essential.

The petrographic work of grinding minerals and fossils into transparent sections for studying purposes with microscope is another problem of which I shall say a few words.

Information regarding the preparation of these sections is given in Part I of Bulletin of United States National Museum No. 39, written by George P. Merrill, at one time curator of the Department of Geology. There are some very important matters which should not be overlooked and which I will here detail.

In cutting the thin section down correctly several things must be taken into consideration. At the stage where the mineral section begins to appear

translucent, the microscope, turning on the crossed nicol (analyzer) will show that the most brilliant color of the different minerals is produced. In ordinary light nearly all of the minerals would be colorless. However, there are exceptions—for instance, the biotite mica which is generally brown, yellow or green; and then too there are minerals in rocks which are metallic and quite opaque. The surface of magnetite in ordinary light is opaque, bluish-black with high metallic luster. Also the opaque mineral pyrite shows under the microscope its clear brassy color. However, the rocks section must be thinned down until all the brilliant colors of the different minerals are eliminated. The grinding must go on with great care and should be done by hand, using the finest abrasive flour on a piece of smooth plate glass.

It must from time to time be watched under the microscope and as the section becomes thinner and more transparent, a noticeable change in color from the brighter to the paler takes place, and if the chip of mineral is more of an even hardness, solid and well cemented on the glass, the desired thinness of the mineral section can, by professional care, easily be obtained so as to show clear crystal outlines and lines of cleavage. As the light passes through the mineral the final thinness will be observed as the colors of the different minerals turn bluish-gray. Also great care must be taken in the petrographic work of fossils for thin sections. Fossils are usually found in limestone and the materials mostly composed of calcite and are rather soft. Extreme care must be taken in thinning down the fossil specimen, for it cuts away quickly and must be examined often under the microscope. The structure must be watched very closely as the thin section begins to be transparent, and the most important matter is to see that the section of fossil is thinned down so that its structure becomes absolutely clear, otherwise if cut too thin the section is of little or no value. The fossil sections are always made in large lots at the same time and after thinned down to the proper thinness are then cleaned and the old balsam removed. A drop or two of balsam in Xelene is then placed on the thin specimen, which is already cemented on a piece of glass of standard size 1" x 3". Enveloped in balsam, a thin cover glass in circular form is placed over it and pressed down close to the thin section. The section is then placed in an oven and baked with a temperature of 85 degrees centigrade (185F) until a sufficient hardness is obtained. Again the sections are cleaned and all the overflowing hard balsam removed from the glass slide. A ring of asphaltum is then placed on the slide all around the edge of cover glass so as to protect the balsam between the glasses from tarnishing. This also affords safe protection to the cover glass, which otherwise might break away with the slightest jar. Arranged in this manner it is ready for studying purposes and also is very attractive to the eye.

These are the important facts in petrographic work of thin sections and would obtain the best results.

Precious Stones

Beauty (fine color, perfect transparency combined with strong luster) hardness susceptibility to a fine polish and rarity of occurrence in specimens suitable for cutting.

Only five stones are recognized as precious: Diamond, Ruby, Sapphire, Emerald and Opal. Pearls, being of organic origin, are not stones, although they are usually considered among the precious stones because of their beauty and rarity.

Synthetic Stones

Stones manufactured by an artificial process are called Synthetic Stones, that is, a process in which the constituent elements of the stone are combined, so that the resulting material has the same composition and physical characteristics of the genuine stone simulated.

Imitation Stones

These are the product of an artificial process in which the material used is other than that of the stone imitated —in the majority of cases the material is glass.

The Story of The Zinc Industry in The Saucon Valley

By RICHMOND E. MYERS, M.A.

PART III—CONCLUSION

THE WATER PROBLEM

As stated previously, the early form of mining, that of surface excavation, soon gave way to that of shaft mining, and developed downwards, underground. At the very beginning of this downward digging, a new and serious problem confronted the miners. The shattered and cavernous character of the limestone in the Saucon Valley permits a very easy passage of underground water. The result was that the water from the entire upper part of the valley found its way into the mines as the workings were sunk deeper and deeper, producing a grade down which the waters might flow.

When they had dug to the depth of forty-six feet, the flow of water was first noticed to be strong. Up to that point it had appeared in the form of seepage, but every foot deeper that they dug, the stronger the seepage became until, to the fear of the superintendent, it was quite evident that the seepage had become a steady flow. At the depth of one hundred and fifty feet, the flow became a flood, and working any deeper was impossible, and work at that depth was almost so. This stage was reached in 1871. Something had to be done. The only answer was, evidently, pumping. Before 1871, small pumps had been in use in the individual mines, which were hand worked and drew the water only from one or two shafts at the most. Each mine took care of its own water problem, at a very high cost. In 1868 for every ton of ore mined, the pumping in each mine cost $6.00, the greatest item in the expenses of the mining.

By 1871 it was decided to install one huge pumping engine, which, working at one mine, would draw the water from all the mines, and keep them clear to work in.

Plans were drawn up for the construction of an engine that could take care of the problem. The project was placed under the superintendency of Mr. John West, and during 1871 the work of construction was begun. The pumping engine when installed and working at the Uberroth Mine, was to take care of the water question for all the mines, and of necessity had to be a large one. The plans drawn up by Mr. West called for the largest engine of its kind ever built at that date. (A single cylinder—double action—condensing, walking beam-engine, 110 inch cylinder—10 foot stroke—seven strokes per miute). It was called "The President," and had a pumping capacity of 12,000 gallons a minute from a depth of 300 feet.

During 1871 the construction of this engine, and its erection at the mines, was one of Bethlehem's biggest topics of interest. It was made in Philadelphia, and brought to Bethlehem in pieces by train. From Bethlehem it was transported to Friedensville by mules, a wonderful accomplishment, and there erected under the supervision of Mr. West. It is a common idea that "The President" was the engine used at the Centennial in Philadelphia to pump the "Niagara Falls," but as one can easily see by the dates of its erection in Friedensville, this story is unfounded. An article from the local paper can best enlighten us as to the work of setting up the great engine:

"Last week a party of Bethlehemites, by invitation, visited the mines, and were present at the raising of one of the great cast iron walking beams for the mammoth pumping engine designed by John West, now being put in the mines. The beam is 40 feet long and weighs 24 tons. It was raised to perpendicular height of 40 ft., and then moved over 24 feet, and set on a stone wall, 9 feet in thickness.

"The arrangement for raising such an extraordinary weight to such a height was complete. A rope 2¾ inches in diameter was attached to the

beam, wound around two tackle blocks, and then coiled over a drum, attached to an engine put up for that purpose. It was wonderful to behold. A piece of iron 24 tons weight, swinging in mid air, attached to a rope 2¾ inches thick. It was looked upon, when swinging in mid air, by the spectators, in almost breathless and profound silence and when it was safely deposited upon the wall, everyone present breathed easier, and seemed relieved of much anxiety. The designing of such an engine, which is the largest in the United States and probably in the world, is a work of great moment. Think of it, quite a number of pieces which weigh from ten to twenty-four tons, run out of a cupola at one time. Think of the finishing of such a piece of iron. Think of transporting it in cars from Philadelphia to Bethlehem, and what is more astonishing, to load 24 tons on a wagon and haul it a distance of four miles over the Lehigh Mountain.

"The entire credit for this great work is due to Mr. West, our worthy townsman. The foundation upon which this mammoth engine rests is on solid limestone rock, and clampings have been set 100 feet below the surface."

Such an account gives one somewhat of an idea of how the people of Bethlehem regarded the pump. During the months of its erection, it is frequently mentioned and commented upon in the columns of the local paper.

It was completed and begun pumping operations on January 29, 1872.

A current story has it that when the pump was officially put into operation, that the occasion was honored by the presence of President Grant. I have found no definite proof of this other than the fact that the President was not in Washington at the time, and that a Washington paper did publish a small notation that he was in the "wilds of Pennsylvania." The General did have friends living in Bucks County, whom he is supposed to have visited about this time, and it is not unlikely that if he were with them, that they drove to Friedensville to see the pump, but there is, as far as I know, no official record of any such a visit. If it had taken place, the local papers would surely have mentioned the matter. Just the same the story persists among the old-timers. Some even suggest the engine was named for him.

Trouble from an unlooked-for source at once presented itself. The pump had hardly been in operation for a few weeks before it was noticed that in keeping the water out of the mines, it also kept the water out of the wells in the surrounding farms. The big engine, running and pumping water from a depth of 225 feet, caused all the wells and springs in the Saucon Valley to become dry, and lawsuits against the company were threatened from all sides. One farmer, whose farm was located at Limeport, about four and one-half miles west of Friedensville, when he saw his well drying up day by day, placed a quantity of chaff into the water, and in a day or two this chaff was noticed coming up in the water pumped out from the Uberroth mine. This threatened litigation on the part of the farmers, however, came to nothing. Contrary to the general opinion, no suit was brought against the company. The courts, had suit been brought, would only have upheld the principle that no mining company is liable for damages incurred by the withdrawal of water from previous users, so long as this withdrawal is necessary to remove ore, and the water is neither sold, nor disposed of in such a manner to damage other property. This decision had been handed down by the Supreme Court in a former case of similar nature, and, hence, although threatened, no suits were forthcoming. Had the farmers got together and raised a goodly sum of money, perhaps something might have come of it, but as it was they did nothing of the sort.

It has been said that, upon hearing of this great supply of water, the city of Philadelphia considered seriously using it for a source of supply, but I have failed to find any verification of this statement, either in Philadelphia or in Bethlehem. In 1874, when considering a source of supply for the immediate demands the Centennial Exposiion were forcing upon the city water bureau, the city of Philadelphia began looking around for a new possibility, and in his annual report for that year, the Chief Engineer of the Water Department suggested three places, the Water Gap, Newhope on the Delaware, or the Perkiomen, but

no mention was made of the Friedensville water.

Last Stages

The mines continued to work until 1876, when the Lehigh Zinc Company suddenly ceased operations, and closed its mines in Friedensville. These were the Uberroth, Old and New Hartman, and the Three Cornered Mines. The belief in general that this sudden closing of the mines was due to two reasons, (1) an imminent exhaustion of the ore, and (2) the threatened litigation of the Saucon farmers. Neither report, however, had any foundation of truth. As before mentioned, the threatened law suits could amount to nothing ,and as for the ore giving out, the deposits had merely been scratched into at that time. The real reason for the closing of the Lehigh Zinc Company's mines was its inability to compete with the New Jersey Zinc Company, and the New Jersey zinc industry in general. The rise of the zinc industry in the Mississippi sections was also beginning to make its competition felt, and the Lehigh Zinc Co. found that it was impracticable to operate the pump and mine the ore. Hence, in 1876, the company found that it was up against a white elephant proposition as far as the pump was concerned. The same year the Wetherill patents for the manufacture of zinc oxide, which were owned by the Lehigh Zinc Company, expired. Up to that time they had been able to prevent the New Jersey Zinc Co. from manufacturing the oxide according to the Wetherill process, but, with the expiration of the Wetherill patents, the monopoly ceased, and the New Jersey Zinc people began the erection of oxide furnaces. Things looked bad. The Lehigh Zinc Company was paying $4.00 a ton to mine the zinc, and the New Jersey Zinc Company 75c. There was only one course. An agreement was made by which the Lehigh Zinc Company closed its mines, and contracted with the New Jersey Zinc Company for 1000 tons of ore a month for a period of five years, finding it far cheaper to buy the ore than to mine it. At the close of the five years term, the New Jersey Zinc Company purchased the Lehigh Zinc Company's plant at Bethlehem, taking over the company, and moving the works to Palmerton, Pennsylvania, where they are today.

The Bergen Point Zinc Company, however, remained on the scene at Friedensville after the Lehigh Zinc Company moved out. Until 1881 they operated the Correll Mine, when it was purchased by Mr. Franklin Osgood, who already had an interest in it. He also purchased the Lehigh Zinc Company's property, and organized the Friedensville Zinc Company. New smelters were built at the Uberroth Mine, and oxide works at the Hartman Mine. The ores, however, were still shipped to Berger Point, and until 1885 little smelting was done at Friedensville.

Mining operations at the Correll and New Hartman Mines continued until 1893, when they were closed. The big pump at the Uberroth mine was run until 1892, to keep the water out of the two other mines being worked during that period.

However, the Friedensville Zinc Company amounted to little. Lack of capital, and the competition of the New Jersey Zinc Company proved its end. It merely ceased operations, and, eventually, was swallowed up by its competitor. To quote once more from the local paper:

"The last chapter of the Friedensville Zinc Company was ended yesterday when Judge Albright of Allentown dissolved the corporation by an act of the court. This company was the owner of the engine President, the largest of the world, which was dismantled by a junk dealer. The dealer paid $10,000 for the old engine, which will return him 110 tons of iron and considerable brass. The dissolution of the company followed the purchase of its mining property of 450 acres, by the New Jersey Zinc Company, which is building an immense plant at Hazards, on the Central R. R. in Carbon County."

The New Jersey Zinc Company owns the mines today, with the exception of the Correll mine. It also owns a good bit of the adjoining property, which it has been buying from time to time. This fact shows that there is a future need for the Friedensville deposits, in the minds of the company's directors. In 1914 and 1915 engineers made an examination of the mines, and water

was pumped from the shaft of the New Hartman Mine for several months. No ore, however, was taken out. The war cut short these operations, but in 1925 drilling was again begun in the vicinity, and is still continued to the time of this writing.

The New Jersey Zinc Company has not announced its intentions regarding the future of these mines, but it is believed that the hope the mines will soon be re-opened is well founded. Surely they could become active producers if operations were once more commenced.

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The following article was called too late to the writer's attention to be used in preparing this paper:

Blank, Eugene W.—**The Old Friedensville Zinc Mines,** Rocks and Minerals, March, 1931, Vol. 6, No. 1, Whole No. 19, pp 26-27.

The Amateur Lapidary

Conducted by J. H. HOWARD*

504 Crescent Ave., Greenville, S. C.

Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

*Author of—*The Working of Semi-Precious Stones.* A practical guide-book written in non-technical language for those who desire to cut and polish semi-precious stones.

"CROOKS DIRECTORY"

To those who kindly co-operated by sending me names and addresses of persons whom they have found unreliable, I must apologize for changing the rules of the game after the play begins. I did not intend to collect this information under false pretense but I have had to change my opinion as to how the collected information may best be used.

The number of complaints was gratifyingly small. Some people have written me that they would later send lists of those with whom they have had trouble and the lists have not been received. Reports have been received against only nine individuals. With one exception there were no duplicate reports. There were four charges against one man. He is supposed to have made restitution in all cases and I believe will give no more trouble. In no other case was one man mentioned in more than one report. So I am convinced that the number of people making a regular game of this form of crookedness is very small.

There is always a chance (remote, it is true) of an injustice being done if a man's name is broadcast on the strength of a single report.

Then there is the legal aspect of the matter. If I or any other individual, or this magazine, should make a mistake, suit might be brought and considerable annoyance and actual money loss incurred.

Then there is the human factor to deal with. Men who feel they have been injured are likely to let their prejudices get the better of their sense of justice and to represent their injuries in a distorted light. This has been brought forcibly to my mind recently by the fact that some reports received were against men with whom my personal dealings have always been most satisfactory.

It is not fair to put a man on a blacklist on the strength of one representation without giving him an opportunity to be heard. Neither this writer nor this magazine has the funds with which to make investigations. So instead of the originally planned scheme I want to submit an alternate one. In offering this I merely modify slightly, a suggestion made by an old mineral dealer. The plan is this:

That the collectors, the exchangers, the sellers of mineral specimens and gem materials, and the sellers of cut gems or lapidary service, form an Association for the collection and dissemination of credit information. I do not know the easy way to do this legally. It may be that the requirements would be met by a Stock Company in which each member would pay a nominal amount for his shares and then would pay a fee for each required investigation. Whatever arrangement was worked out it should be such that the liability of the Association would be limited to the amount of its subscribed stock and in such form that no individual would be personally liable in case of suit. The details of the arrangement would have to be

worked out by a lawyer. I hope some kind friend versed in legal affairs will volunteer to donate his services to this cause.

The operator of the "clearing house" should serve without compensation except that he should be paid a reasonable sum for each report or investigation and the payment of this should be directly from the member requiring the report or investigation.

The work involved would not be great. The duties would consist of:

Receiving reports and complaints.

Tabulating, recording and transmitting these reports.

Investigating the reports to be sure that they are well founded.

Doing a certain amount of educational advertising in the mineralogical magazines for the purpose of awakening a proper sense of responsibility and decency in those who get goods on consignment or approval.

The writer, while not wishing to shirk any reasonable duty, is not willing to assume this work because he has no time in which to do it properly. Also, the work could be better done and more properly assumed by some individual or company regularly engaged in selling or exchange.

I would be glad to help establish the contacts necessary to the institution of such an Association and to do anything I can to assure its successful operation.

J. H. HOWARD.

Courtesy of Houston Museum of Natural History

Galena Crystals on Chert, Picher, Oklahoma

Mineral Oddities

Obsidian is a variety of volcanic glass, an igneous rock, often known as natural glass, because in appearance, luster, hardness, and fracture it approaches ordinary glass. Obsidian in general has a black color, and appears to be opaque but on edges of thin chips it will be seen it is transparent to translucent with a more or less smoky color.

Under the microscope it is quite colorless but filled with minute, black, dust-like particles which are probably specks of magnetite representing the beginnings of crystallization. Diffused through the glass, they act as a pigment, coloring it black. When the magnetite has been oxidized to hematite, the color is red or brown.

In physical appearance there seems to be very little in common between obsidian and the granular structure of granite, but in composition they are the same, and had the same opportunity been given the obsidian to crystallize, it would undoubtedly have been granite. Abundant reason exists for assuming that the constituents of granite, when in the fluid state, were mutually dissolved one into another, like a mixture of alcohol and water. Also it is evident that the elements had ample opportunity to unite in the varied compounds which make up the granite's structure. On the other hand obsidian, cooled too quickly for any combination to take place, even such crystallization as seems to have set in with the magnetite, being very embryonic. But it can readily be shown by calculation that had the molten obsidian had an opportunity to crystallize, it would have produced a rock consisting of 35 per cent of quartz, 60 per cent of feldspar, with 5 per cent of other minerals, that is to say, a granite.

Obsidian is found in large amounts throughout western United States but its most noted locality is that of Obsidian Cliff, in Yellowstone Park, Wyoming. Another locality which has but recently forged to the front, is Stauffer, Oregon, where P. L. Forbes discovered obsidian in coloring and type entirely different from that found elsewhere. The most unique is "iridescent Obsidian," a black type consisting of minutely small parallel bands which show a play of colors. Another type is "golden obsidian"; still another is "silvery obsidian." Lipari Islands, a few miles north of the island of Sicily, in the Mediterranean Sea, is the most famous foreign locality.

Obsidian, because it breaks with very sharp cutting edges, has long been used by Indians and other primitive people for implements of war and domestic use.

In Memoriam

George I. Hopkins, former headmaster of Manchester (N. H.) High School, and for many years a well-known educator and scientist, died at his home, 841 Beech Street, on February 26. Mr. Hopkins retired as principal of the high school in 1921 after forty-one years of service. He was a native of Foster, R. I. and was a graduate of Brown University with the class of 1875. Mr. Hopkins' chief interests were along the lines of science and mathematics, and he was the author of the "Inductive Plane Geometry", the distinctive feature of which is the call for original demonstration by the pupil of theorems and constructive problems elsewhere given for memorization.

One of the founders of the Manchester Institute of Arts and Sciences, Mr. Hopkins was curator and head of the physical science department at the time of his death.

He became a subscriber to Rocks and Minerals on July 16, 1926 before the first issue of the magazine, which was in September, subsequently upon the formation of the Rocks and Minerals Association he became one of its most interested members.

Collector's Kinks

Collectors are cordially invited to submit notes from their experiences and so make this department of interest to all.

It is sometimes difficult to affix the identifying number on a very rough or a very small mineral. Here is a method that will work on any of them. With a regular paper punch, punch out a number of circular pieces from a good grade of white paper. These will be ¼" or less in diameter. By holding one edge with the finger, the number can be written on the disks with a fine pen and Indian ink. Let the ink dry thoroughly and the number is ready to be put on the mineral. Pick out a comparatively flat spot in the mineral and spread a thin layer of shellac, over it. Then place the numbered disk on this shellac, let it dry a few minutes and put a thin layer of shellac over the paper. The specimen can then be rinsed in water if necessary without disturbing the number. This is particularly useful for those short of space where the name or number can not appear as they would ordinarily. It also adds to the appearance inasmuch as the identifying number does not cover up much of the specimen.

C. W. REITSCH.

Club and Society Notes

New Haven Mineral Club

At the first annual meeting of the club, held last October, and which marked the end of a very fruitful year, the following officers were elected for the New Year:

Frederick S. Eaton, President; Leon Glouskin, Vice-President; Lillian M. Otersen, Treasurer; Harold Y. Banquer, Secretary.

On November 19th the club was invited to the home of Prof. Arthur Sandiford to view an exceptional collection of agates which he had collected over a period of years.

On Dec. 17th, the Club had the pleasure of hearing an interesting talk on fluorescent and phosphorescent minerals delivered by Mr. Ernest Weidhaas of the New York Mineralogical Club. This was the first lecture of its kind and proved most instructive to the members.

On Jan. 21st, Mr. Stephen Varni of Stephen Varni Co., Inc. gave an illustrated talk on gems and gem ancedotes. Mr. Varni also displayed a number of fine specimens of precious and semi-precious stones, among which was the famous Varni Star.

On Feb. 18th, Prof. Chester Longwell of Yale University addressed the Club. His subject was Boulder Dam Reservoir. Aside from its awe-inspiring splendor as an engineering feat, the geology of the terrain was discussed.

HAROLD Y. BANQUER, Sec.

MINERALOGY QUIZ

(Answers on Page 64)

1. What is obsidian?
2. What is it composed of?
3. What are its chief colors? Its hardness?
4. Name 3 important localities for obsidian?
5. What beautiful variety of obsidian is found at Stauffer, Ore.?
6. Who discovered it?
7. Name an important use for obsidian?
8. Can obsidian be used as a gem stone?

Bibliographical Notes

The Minerals of Lancaster County: By Herbert H. Beck, Professor of Chemistry and Mineralogy and Director of the Museum of Franklin and Marshall College. Publication of the Linnaean Society of Lancaster County, Lancaster, Penn., 1934, 12 pages, 1 map, (second edition).

Describes briefly many of the minerals with their localities that occur in this county; some of the localities are world famous.

A Story in Stone of the Time When the Earth Was Young: By Harold Orville Whitnall, Professor of Geology, Colgate University, Hamilton, N. Y. 16 pages, 8 illustrations.

A delightfully interesting little story on one of the world's geological marvels, the "petrified gardens" near Saratoga Springs, N Y.. The author says, "In the 'Petrified Gardens' the earliest and latest of creation's children meet. On the surface of the rocky floor are the records of a strange and primitive plant entombed in sepulchers of stone. Over this age long mausoleum walks man, the latest and highest form molded in the work-shop of the Great Artificer."

The "Petrified Gardens" are on the property of Mr. Robert R. Ritchie, a subscriber to ROCKS and MINERALS. An outing will be held here Sunday, May 19th, when the National Rocks and Minerals Association's outings throughout the country will take place.

Mineral Specimens, List No. 5, March 1935, 8 pages. This is the latest price list issued by Ralph W. Tuthill, 110 Earl Road, Michigan City, Indiana. During 1934, Mr. Tuthill's mineral offers met with such wide appeal that his business expanded greatly and he has acquired a larger and better stock of choice specimens than ever before. The present list features hundreds of very interesting specimens, from many of the world's leading localities, and all priced reasonably. By all means secure a copy of this price list; many of the items will surely intrigue you.

Acknowledgments

We wish to acknowledge receipt and express our sincere thanks for specimens and other donations recently sent us by some of our subscribers.

Allison Albee, Rye, N. Y., two photos of two old mines in Putnam County, N. Y.

S. A. Arbuthnot, Berros, Calif., an interesting specimen of a petrified oak limb.

William Donald, Bloomingdale, N. J., one fine specimen of xled cassiterite from Cornwall, England.

P. L. Forbes, Stauffer, Oregon, another assortment of interesting minerals from his locality including one large polished iridescent obsidian.

F. G. McIntosh, Beverly Hills, Calif., one choice little fluorescent moss agate from a new locality in California.

Jorge Morlon, Havana, Cuba, two dainty little magnesites from Regla (Havana).

H. W. Ricksecker, Lancaster, Penn., a copy of **The Minerals of Lancaster County (Penn.)** by Herbert H. Beck.

MINERALOGY QUIZ—Answers

(Questions on Page 63)

1. A variety of volcanic glass.
2. Its composition is similar to that of granite.
3. Usually black, gray, red or brown. H 7.
4. Obsidian Cliff, in Yellowstone Park, Wyo.; Stauffer, Ore.; Lipari Islands, near Italy.
5. Iridescent obsidian.
6. P. L. Forbes of Stauffer.
7. Used by the Indians and primitive people for knives, spearheads, and other implements and weapons.
8. Yes.